

Light Transport Techniques for Tensor Field Visualization

Master's Thesis Presentation

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Fundamentals - Finite-Time Lyapunov exponents

Definition

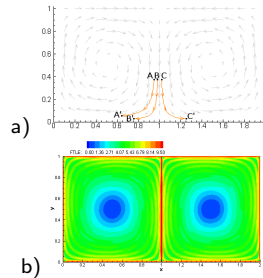
Local: $\sigma = \frac{1}{|T|} \ln \frac{\Delta}{\delta}$

Global: $\sigma(\mathbf{x}) = \frac{1}{|T|} \ln \|\nabla \mathbf{u}(\mathbf{x})\|_2$

where $\|A\|_2 = \sqrt{\lambda_{\max}(A^T A)}$ is the spectral norm of matrix A

- measures gradient of flow map $\nabla \mathbf{u}(\mathbf{x})$
- FTLE field responds largest where path lines diverge

Double Gyre Field



a) Vector field, b) FTLE field